

ELECTRIC DEVICE AND DISPLAY PANEL THEREOF

This application claims the benefit of U.S. provisional application Ser. No. 61/140,896, filed Dec. 26, 2008, the subject matter of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates in general to an electronic device and a display panel thereof, and more particularly to an electronic device adopting flat display technology and a display panel thereof.

2. Description of the Related Art

Along with the advance in technology, various electronic devices, which bring a large amount of convenience to modern people in their daily life, are continually provided. An electronic device normally displays the information or message on a display panel. Generally speaking, the larger the display panel, the more information can be displayed thereon, and the larger amount of convenience is provided to the user.

However, the display panel is normally disposed outside the casing of the electronic device. Such design makes the display panel greatly limited by the size of the casing. If the designer would like to increase the area of the display panel, the volume of the electronic device will inevitably be increased and the portability of the electronic device is deteriorated. If the electronic device maintains having a small volume, the area of the display panel cannot be increased. Thus, how to extend the display panel when the electronic device has a limited volume has become a focus of research and development to manufacturers.

SUMMARY OF THE INVENTION

The invention is directed to an electronic device and a display panel thereof. The design of having a bending mechanism and a sliding mechanism allows the electronic device to extend the display panel according to the needs.

According to a first aspect of the present invention, an electronic device is provided. The electronic device includes a first display panel and a casing. The first display panel has a first displaying part and a second displaying part. The first display panel includes a first bending mechanism which is disposed between the first displaying part and the second displaying part to bend or spread the first display panel. The casing has a first surface and a second surface opposite to the first surface. The casing includes a rail mechanism which is disposed on the second surface. The second displaying part is slid on the rail mechanism to shift the first display panel relatively to the casing.

According to a second aspect of the present invention, a display panel is provided. The display panel has a first displaying part and a second displaying part. The display panel is disposed inside a casing. The casing has a first surface and a second surface opposite to the first surface. The casing includes a rail mechanism which is disposed on the second surface. The display panel includes a bending mechanism which is disposed between the first displaying part and the second displaying part to bend or spread the first display panel. The second displaying part is slid on the rail mechanism to shift the first display panel relatively to the casing.

The invention will become apparent from the following detailed description of the preferred but non-limiting embodiments. The following description is made with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows an electronic device according to a first embodiment of the invention;

FIG. 2 shows a display panel of an electronic device being spread according to a first embodiment of the invention;

FIG. 3 shows a display panel of an electronic device being spread and extended according to a first embodiment of the invention;

FIG. 4 shows a display panel of an electronic device being spread, extended and erected according to a first embodiment of the invention;

FIG. 5 shows an enlarged view of a bending mechanism according to a second embodiment of the invention;

FIG. 6 shows a benditure detecting unit and a shift detecting unit according to a third embodiment of the invention;

FIG. 7 shows a shift detecting unit according to a fourth embodiment of the invention;

FIG. 8 shows an electronic device according to a fifth embodiment of the invention;

FIG. 9 shows a bending mechanism according to a sixth embodiment of the invention;

FIG. 10 shows a bending mechanism according to a seventh embodiment of the invention;

FIG. 11 shows a bending mechanism according to an eighth embodiment of the invention;

FIG. 12 shows a bending mechanism according to a ninth embodiment of the invention; and

FIG. 13 shows a bending mechanism according to a tenth embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention is exemplified by a number of embodiments disclosed below. However, the embodiments are for exemplification only, not for limiting the scope of protection of the invention. Also, secondary elements are omitted in the following embodiments to highlight the technical features of the invention.

First Embodiment

Referring to FIG. 1, an electronic device according to a first embodiment of the invention is shown. The electronic device 100 includes a display panel 110, a touch panel 130, a casing 140, a processing unit 150, a benditure detecting unit 160 and a shift detecting unit 170. The electronic device 100 is a notebook computer, a game station, a personal digital assistant (PDA), a mobile phone, an electronic book, an electronic reader, a global positioning system (GPS) receiver, a medical apparatus or a recording apparatus for example. In the present embodiment of the invention, the display panel 110 is a flexible display panel such as an organic light-emitting diode display (OLED display) or an electronic paper for example. The touch panel 130 is a liquid crystal display panel (LCD panel), an OLED display or an electronic paper for example. The processing unit 150 is for controlling the display panel 110 and the touch panel 130. The display panel 110 of the present embodiment of the invention can be bent and shifted relatively to the casing 140. The benditure detecting unit 160 is for detecting the benditure of the display panel 110. The shift detecting unit 170 is for detecting the shift of the display panel 110.

Furthermore, the display panel 110 has a first displaying part 111 and a second displaying part 112. The display panel 110 includes a bending mechanism 113. The bending mechanism 113 is disposed between the first displaying part 111 and